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PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE HONORABLE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Application of

Nobuaki HASHIMOTO

Group Art Unit: 2822

Application No.: 09/615,503

Examiner: D. Graybill

Filed: July 13, 2000

Docket No.: 101929.02

For: SEMICONDUCTOR DEVICE, METHOD OF FABRICATING THE SAME, CIRCUIT BOARD, AND ELECTRONIC APPARATUS

REPLY BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The following remarks are directed to the new points of argument raised in the Examiner's Answer dated August 10, 2004.

(1)-(4) Admitted.

(5) The Examiner asserts that the Summary of Invention contained in the Brief is deficient because does not refer to the specification by page and line number, and to the drawing by reference characters. Applicant submits that the Summary of Invention is not deficient. The structure of the invention is referred to in detail in Section IIC1 of Applicant's Brief on Appeal. For further reference, see specification at page 14, lines 21 - page 15, line 6.

(6) The Examiner asserts that the scope of claim 1 is not limited to a process wherein "the device is removed from the reel to reel transport system". The Examiner's assertion regarding the scope of claim 1 is respectfully traversed. As stated in the specification at page

14, line 27, "since it is difficult to form the external terminals 14 in a reel to reel transport system, the external terminals 14 are provided after cutting the tape..." Furthermore, as the specification states, "the external terminals 14 can be provided using a general purpose device." Thus, the specification discloses that the external terminals are not provided on a reel to reel transport system and instead are provided using a general purpose device.

Furthermore, and more importantly, the claim language itself traverses the Examiner's position. Claim 1 recites "(c) providing a plurality of external terminals on each of the substrates after the step (b)" (cutting the tape to obtain substrates). Step (c) cannot be performed on a reel to reel transport system. Once the tape has been cut in step (b), the resulting plurality of individual substrates cannot be wound on a reel.

(7)-(10) Admitted.

A. (11) Providing External Terminals After Separating Metal Carrier Frame Eliminates The Need For The Carrier Frame In Shim

The Examiner asserts that Applicant's arguments regarding providing the external terminals after cutting the carrier into individual BGA packages in Shim (the 633 patent) would teach away from the purpose of the invention are ambiguous, unclear and unpersuasive. Applicant submits that these are not factual arguments, but instead go to the probative weight of Applicant's arguments and therefore are questions for the Board.

However, Applicant's arguments are not ambiguous, unclear or unpersuasive. Specifically, Shim discloses a BGA semiconductor package which utilizes a metal carrier frame to prevent thermal deformation of printed circuit boards during repeated high temperature processing steps. Providing external terminals after separating the metal carrier frame into individual BGA packages would partially eliminate the need for the metal carrier frame because the build up of heat that causes the thermal deformation would be reduced.

B. Applicant Has Satisfied The Requirements of *In Re Burhans*

The Examiner asserts that Applicant has not satisfied the requirements of *In re Burhans*, 154 F.2d 690, 69 USPQ 330, (CCPA 1946). *In re Burhans*, provides "it is well established that, in a well known process, the order of performing process steps is *prima facie* obvious in the absence of new and unexpected results". (See MPEP §2144.04(IV)(c) and *Ex Parte Taniguchi et. al.*, 2001 WL 1197769 (Bd. Pat. App. & Interf) "new or unexpected results.") Applicant contends that the invention provides new results in that it is easier to provide the external terminals and disposal losses are reduced. The Examiner should not belittle the new result based on the Examiner's personal perception that the new result is insufficient. Furthermore, the results are unexpected. The reel to reel transport system is used to increase efficiency. However, in Applicant's invention, the removal of a portion of the process from the reel to reel transport system further increases efficiency by making it easier to provide external terminals and reduce disposal losses. One of ordinary skill in the art would assume that removing a portion of the process from the reel to reel transport system would be inefficient.

C. The Applicant's Invention Would Not Have Been Obvious

The Examiner alleges

"it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose the particular claimed sequence because Applicant has not disclosed that, in view of the applied prior art, limitation is for a particular unobvious purpose, produces an unexpected result, or is otherwise critical. Moreover, it is well established that in a well known process, the order of performing process steps is *prima facie* obviousness in the absence of new and unexpected results"

provides the motivation to modify Shim.

Applicant asserts that these are mere recitations and do not provide any evidence of motivation. MPEP §2142 provides that the initial burden is on the Examiner to provide some

suggestion of the desirability of doing what the inventor has done. For example, MPEP §2142 states:

"To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the Examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references" citing *Ex parte Clap*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985).

However, there is no teaching in either of the references that recognize the problem to be solved by the invention, i.e., making it easier to provide the external terminals and reducing disposal losses. The lack of motivation to modify or combine the references is further evidenced by the Examiner's use of the "catch-all" obviousness rejection of "matter of design choice".

Even where the prior art discloses all of the features of the claimed invention, if there is no motivation or suggestion to combine the references, one of ordinary skill in the art can not view the invention as obvious. *Winter Intern Royalty Corp. v. Wang*, 202 F3d. 1340, 1349 (Fed. Cir. 2000).

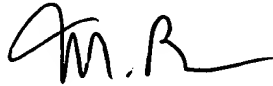
The Examiner correctly points out that Marrs (the 378 patent) discloses that other methods for manufacturing ball grid packages, such as a reel to reel printed circuit board manufacturing, could be employed. See col. 9, lines 38-41, and col. 15, lines 4-43. "Furthermore, like ball grid array packages 200 and 300, ball grid array packages 400 and 400D can be produced by other methods known to those of skill in the art such as reel to reel printed circuit board manufacturing." However, both of these statements must be placed in the proper context.

It is important to note that Marrs discloses a method to assemble individual ball grid array packages at col. 9, line 43 - col. 10, line 32, and at col. 14, line 58 - col. 15, line 32. Both

of these methods start with 9"x12" panels that are not used in conjunction with a reel to reel transport system. Using these methods, solder ball are applied once strips of package unit have been formed from the panels. Marrs does not disclose that solder balls or external terminals are provided after the panel has been cut into strips on a reel to reel transport system. In fact, Marrs states that ball grid array packages, 200, 300, 400 and 400D, all final products with the external terminals formed thereon, can be produced in a reel to reel manufacturing method. This, at the very least, implies that the external terminals are also formed while still on the reel to reel transport.

For at least the reasons set forth herein and in the Appeal Brief. It is respectfully submitted that claims 1-9 and 12020 are in condition for allowance.

Respectfully submitted,



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